

## **WHAT IS CLAIMED IS:**

1. An apparatus for mounting an electronic component onto a board through a lead-free solder material by means of a flow soldering process while transferring the board, which apparatus comprises:

a solder material supplying chamber in which a melt of the solder material is supplied to the board by a solder material supplying unit such that the solder material adheres to a predetermined portion of the board; and

a cooling chamber in which the board is cooled by a cooling unit such that the solder material adhering to the board is rapidly cooled to solidify.

2. The apparatus according to claim 1, wherein the cooling unit is operated such that the solder material is cooled at a cooling rate which is not less than 200°C/min.

3. The apparatus according to claim 1, wherein the cooling unit uses gas cooling or liquid cooling.

4. The apparatus according to claim 3, wherein the cooling unit uses the gas cooling with nitrogen gas.

5. The apparatus according to claim 1, which apparatus further comprises a conditioning chamber between the solder material supplying chamber and the cooling chamber, in which conditioning chamber the board is conditioned such that the solder material adhering to the board in a completely molten condition is ensured at least before the rapid cooling of the solder material.

6. The apparatus according to claim 5, wherein a temperature of an atmosphere in the conditioning chamber is in the range between a melting point of the solder material and a heat resistant temperature of the electronic component.

7. The apparatus according to claim 5, wherein the conditioning chamber contains an atmosphere of nitrogen gas.